$$\frac{d}{dx}\left[x^7(x+y)\right] = \frac{d}{dx}\left[y^2(8x-y)\right]$$

$$\Rightarrow \quad x^7(1+y') + (x+y)\cdot 7x^6 = y^2(8-y') + (8x-y)\cdot 2y\,y'$$

$$\Rightarrow \quad x^7 + x^7\,y' + 7x^7 + 7x^6y = 8y^2 - y^2\,y' + 16xy\,y' - 2y^2\,y'$$

$$\Rightarrow \quad x^7\,y' + 3y^2\,y' - 16xy\,y' = 8y^2 - 8x^7 - 7x^6y$$

$$\Rightarrow \quad (x^7 + 3y^2 - 16xy)\,y' = 8y^2 - 8x^7 - 7x^6y$$

$$\Rightarrow \quad y' = \frac{8y^2 - 8x^7 - 7x^6y}{x^7 + 3y^2 - 16xy}$$